WHAT IS CLAIMED IS:

1. A method for lessening the severity of damage to neural tissue located within the body of a mammalian patient after said neural tissue has become ischemic or has been otherwise affected by a disease, disorder or trauma which can cause subsequent damage, infarction, hemorrhage or necrosis of said tissue, said method comprising the steps of:

A. selecting a portion of the body containing the tissue, which portion receives a flow of a body fluid.

B. providing a heat exchange catheter device which comprises; i) an elongate, flexible catheter having a proximal end, a distal end, and an insertion portion for insertion into a patient's body ii) at least one fluid lumen through which a thermal exchange fluid may be circulated and iii) a heat exchanger located a first location on the catheter along a length of said insertion portion which is less than the entire length of said insertion portion, said heat exchanger being operative to exchange heat between body fluid which flows in heat exchange proximity to said heat exchanger and the thermal fluid which is circulated through said catheter;

C. inserting the catheter into the fluid-containing body structure of the patient and positioning the catheter such that fluid flowing through the body structure will pass in heat exchange proximity to the heat exchanger before reaching the selected body portion;

D. circulating a heat exchange fluid through the fluid lumen of the catheter device, such that body fluid will pass in heat exchange proximity to the

heat exchanger, said heat exchange fluid being at a temperature other than the body fluid, whereby the temperature of the body fluid will be altered, and will subsequently flow to said neural tissue;

E. maintaining the catheter in said position and with the heat transfer fluid at said temperature for a sufficient time to alter the temperature of the neural tissue.

2. The method of Claim 1 wherein the fluid containing body structure recited in Step C is a blood vessel and the body fluid recited in Step A is blood.

3. The method of Claim 2 wherein the blood vessel is an artery.

4. The method of Claim 2 wherein the blood vessel is a vein.

5. The method of Claim 1 wherein the body portion in Step A is the brain.

6. The method of Claim 5 further comprising:

F. maintaining the selected portion of the body in Step A at a temperature different than that of the rest of the patient's body.

7. The method of Claim 6 wherein Step F comprises wrapping at least a portion of the patient's body below the head in warming blankets.

8. The method of Claim 1 wherein the catheter device provided in Step A further comprises iv) a blood channeling sleeve formed about a segment of said catheter whereon said heat exchanger is located such that a blood flow space exists between said catheter and said blood channeling sleeve, said blood channeling sleeve having a blood inlet located proximal to at least a portion of the heat exchanger and a blood outlet located distal to at least a portion of said heat exchanger, and wherein the catheter is positioned in Step B such that blood which exits the blood outlet will flow to a blood vessel which perfuses said neural tissue.

9. The method of Claim 8 wherein the catheter is further positioned in Step B such that the blood outlet is within a first blood vessel which leads to said neural tissue and the blood inlet is within a second blood vessel, blood from the second blood vessel being thereby channeled through the blood channeling sleeve in heat exchanging proximity to the heat exchanger, and subsequently flowing into said first blood vessel to cool said neural tissue.

10. The method of Claim 9 wherein the neural tissue is located in the brain and the first blood vessel is selected from the group consisting of:

right common carotid artery;

left common carotid artery;

innominate artery;

right internal carotid artery; and,

left internal carotid artery.

11. The method of Claim 10 wherein the second blood vessel is the aorta.

12. The method of Claim 11 wherein the blood inlet of the blood channeling sleeve is located within the descending aorta.

13. The method of Claim 9 wherein at least a portion of the blood channeling sleeve is located in said first blood vessel, and has an outer diameter that is approximately as large as the luminal diameter of the first blood vessel such that blood is substantially prevented from entering the first blood vessel other than through the blood flow space between the catheter and the blood channeling sleeve.

14. The method of Claim 13 wherein the first blood vessel is a branch vessel which emanates from the arch of the aorta and the second blood vessel is the aorta.

15. The method of Claim 9 wherein at least a portion of the blood channeling sleeve is located in said first blood vessel, said blood channeling sleeve having a shoulder between said blood inlet and said blood outlet, said shoulder sized to cause at least a partial occlusion between said first blood vessel and said second blood vessel to prevent blood flowing from said second blood vessel to said first blood vessel other than through said blood channeling sleeve.

16. The method of Claim 1 further comprising the steps of:

D. providing a second heat exchange catheter device which comprises; 1) an elongate, flexible catheter having a proximal end and a distal end, ii) a heat exchanger located at a first location on the catheter, said heat exchanger being operative to exchange heat between blood which flows in heat exchanging proximity to said heat exchanger and the heat exchanger;

E. inserting the second catheter into the patient's vasculature and positioning it at a second location such that blood which has cooled the neural tissue in Step C of the method will subsequently flow in heat exchange proximity to the heat exchanger of the second catheter; and,

F. adding heat to said blood.

17. The method of Claim 1 wherein the catheter device provided in Step A further comprises a working lumen and wherein the positioning of the catheter in Step B is accomplished by advancing the catheter over a previously inserted guide wire such that the guide wire extends through the working lumen of the catheter.

18. The method of Claim 1 wherein the catheter device provided in Step A further comprises a working lumen and wherein the method further comprises the step of:

D. infusing a medicament through the working lumen of the catheter to deliver said medicament to the neural tissue.

19. The method of Claim 18 wherein the medicament is selected from the group of medicaments consisting of:

a thrombolytic agent;

an anticoagulant;

a neuro-protectant;

a barbiturate;

a anti-seizure agent;

an oxygenated perfusate;

a vaso-dilator;

an agent which prevents vaso-spasm;

an agent which inhibits platelet activation; and,

an agent which deters the adhesion of platelets.

20. The method of Claim 1 wherein the catheter device provided in Step A further comprises a working lumen and wherein the method further comprises the step of:

D. infusing a radiographic contrast agent through the working lumen of the catheter to permit imaging in the area of said neural tissue.

21. The method of Claim 1 wherein the catheter device provided in Step A further comprises a working lumen and wherein the method further comprises the step of:

D. passing a therapeutic apparatus through the working lumen of the catheter and using such therapeutic apparatus to perform a therapeutic task

22. The method of Claim 21 wherein the therapeutic apparatus passed through the working lumen of the catheter in Step D is selected from the group of therapeutic apparatus consisting of:

an angioplasty catheter;

an embolectomy catheter;

an occlusion member delivering catheter;

an electro-cautery device; and,

a microcatheter

23. The method of Claim 1 wherein the catheter device provided in Step A further comprises a working lumen and wherein the method further comprises the step of:

D. passing a diagnostic device through the working lumen of the catheter and using such diagnostic device to perform a diagnostic procedure.

24. The method of Claim 23 wherein the diagnostic device is selected from the group consisting of:

an angiographic catheter;

a sensor.

25. The method of Claim 1 wherein the neural tissue is brain tissue which has become ischemic or has suffered hypoxic insult due to a stroke.

26. The method of Claim 1 wherein the neural tissue is brain tissue which has suffered hypoxic insult due to cardiac arrest

27. A method for changing the temperature of a selected region a mammalian body, said method comprising the steps of:

A. providing a heat exchange catheter device which comprises an elongate flexible catheter, said catheter having an insertion portion which is inserted into a patient's body, having a heat exchanger which constitutes significantly less than the length of said insertion portion, said heat exchanger is operative to exchange heat between body fluid which flows in heat exchanging proximity to said heat exchanger,

B. inserting the catheter into an anatomical conduit of the patient's body through which a body fluid flows to the selected region of the patient's body, and positioning the catheter such that body fluid flowing through the anatomical conduit to the selected region will pass in heat exchanging proximity to the heat exchanger before reaching said selected region; and,

C. utilizing the heat exchanger of the catheter device to change the temperature of body fluid which passes in heat exchanging proximity to the heat exchanger, such that said body fluid will subsequently change the temperature of said selected region of the patient's body.

28. The method of Claim 27 wherein the method is performed to warm the selected region to a temperature above normal body temperature.

29. The method of Claim 27 wherein the method is performed to cool the selected region to a temperature below normal body temperature.

30. The method of Claim 27 wherein the selected region of the patient's body is selected from the group consisting of:

the brain;

a selected portion of the brain;

the spinal chord;

an organ;

an intra-abdominal organ;

the spleen;

the liver;

the heart;

a portion of the heart;

a lung;

a kidney'

a muscle;

a tumor;

a site where trauma has occurred; and,

a site where hemorrhage has occurred.

31. The method of Claim 27 wherein the anatomical conduit is a blood vessel and the body fluid is blood.

32. The method of Claim 27 wherein the catheter device provided in Step A comprises:

i) an elongate, flexible catheter having a proximal end and a distal end;

ii) at least one fluid lumen through which a thermal exchange fluid may be circulated through the catheter; and,

iii) said heat exchanger being located at a first location on the catheter and being operative to exchange heat between blood which flows in heat exchanging proximity to said heat exchanger and the thermal exchange fluid which is circulated through said catheter.

33. The method of Step 32 wherein Step C of the method is carried out by circulating a thermal exchanged fluid through the fluid lumen of the catheter.

34. The method of Claim 27 wherein the catheter device provided in Step A further comprises (iv) a body fluid channeling sleeve formed about a segment of said catheter whereon said heat exchanger is located such that a fluid flow space exists between said catheter and said body fluid channeling sleeve, said body fluid channeling sleeve having a body fluid inlet located proximal to the heat exchanger and a body fluid outlet located distal to said heat exchanger, and wherein the catheter is positioned in Step B such that body fluid which exists the body fluid outlet will flow to the anatomical conduit through which body fluid flows to the selected region of the patient's body.

35. The method of Claim 34 wherein the catheter is further positioned in Step B such that the body fluid outlet is within a first anatomical conduit which leads to said selected region and the body fluid inlet is within a second anatomical conduit, body fluid from said second anatomical conduit being thereby channeled through the body fluid channeling sleeve in heat exchanging proximity to the heat exchanger, and subsequently flowing into said first anatomical conduit to change the temperature of said selected region of the patient's body.

36. The method of Claim 27 further comprising the steps of:

D. providing a second heat exchange catheter device which comprises a second elongate flexible catheter having a heat exchanger which is operative to exchange heat between blood which flows in heat exchanging proximity to said heat exchanger;

E. inserting the second catheter into a second anatomical conduit of the patient's body through which a body fluid flows from the selected region of the patient's body, and positioning the catheter such that body fluid which has changed the temperature of the selected region will pass in heat exchanging proximity to the heat exchanger of the second catheter; and,

F. utilizing the heat exchanger of the second catheter device to change the temperature of the body fluid which passes in heat exchanging proximity to the heat exchanger, such that said body fluid will be approximately the same as it was before it had undergone the previous temperature change in Step C of the method.

37. The method of Claim 27 wherein the method is performed to warm the selected region to a temperature above normal body temperature.

38. The method of Claim 27 wherein the method is performed to cool the selected region to a temperature below normal body temperature.

39. The method of Claim 27 wherein the catheter device provided in Step A further comprises a working lumen and wherein the positioning of the catheter in Step B is accomplished by advancing the catheter over a previously inserted guide wire such that the guide wire extends through the working lumen of the catheter.

40. The method of Claim 27 wherein the catheter device provided in Step A further comprises a working lumen and wherein the method further comprises the step of:

D. infusing a medicament through the working lumen of the catheter to deliver said medicament to the selected region of the patient's body.

41. The method of Claim 40 wherein the medicament is selected from the group of medicaments consisting of:

a thrombolytic agent;

an anticoagulant;

a neuro-protectant;

a barbiturate;

a anti-seizure agent;

an oxygenated perfusate;

a vaso-dilator;

an agent which prevents vaso-spasm;

an agent to prevent platelet activation; and,

an agent to deter the adhesion of platelets.

42. The method of Claim 27 wherein the catheter device provided in Step A further comprises a working lumen and wherein the method further comprises the step of:

D. infusing a radiographic contrast agent through the working lumen of the catheter to permit imaging in the selected region of the patient's body.

43. The method of Claim 27 wherein the catheter device provided in Step A further comprises a working lumen and wherein the method further comprises the step of:

D. passing a therapeutic apparatus through the working lumen of the catheter and using such therapeutic apparatus to perform a therapeutic task in the selected region of the patient's body.

44. The method of Claim 43 wherein the therapeutic apparatus passed through the working lumen of the catheter in Step D is selected from the group of therapeutic apparatus consisting of:

an angioplasty catheter;

an embolectomy catheter;

an occlusion member delivering catheter;

an embolization member delivering catheter;

an electro-cautery device; and,

a microcatheter.

45. The method of Claim 27 wherein the catheter device provided in Step A further comprises a working lumen and wherein the method further comprises the step of:

D. passing a diagnostic device through the working lumen of the catheter and using such diagnostic device to perform a diagnostic procedure.

46. The method of Claim 45 wherein the diagnostic device is selected from the group consisting of:

an angiographic catheter;

a sensor.

47. A method of controlling the temperature of a selected region of a patient's body, the method comprising the steps of:

A. selecting a region of the patient's body, which region receives a flow of body fluid;

B. providing a heat exchange catheter device which comprises an elongate flexible catheter having a heat exchanger, said heat exchanger having

an insertion portion for insertion into a patient, said heat exchanger located on said insertion portion but occupying significantly less length than the length of said insertion portion, said heat exchanger operative to exchange heat with the body fluid which flows in heat exchange proximity to said heat exchanger;

C. inserting the catheter into an anatomical conduit of the patient's body through which said body fluid flows to said selected region of the patient's body, and positioning said catheter such that the body fluid flowing through the anatomical conduit to the selected region will pass in heat exchange proximity to the heat exchanger before reaching said select region of the patient's body;

D. providing a sensor for sensing the temperature of tissue within the patient's body, and placing the sensor so that it senses a temperature that represents the temperature of the selected region and generates a signal that represents said sensed temperature;

E. determining a pre-selected temperature and providing said pre-selected temperature to said controller;

F. comparing said sensed temperature with said pre-selected temperature to determine a comparison value; and

G. controlling the amount of heat transferred between said heat exchanger and said body fluid based on said comparison value.

48. The method of Claim 47, where the heat exchanger of Step B comprises a heat exchange balloon having heat exchange fluid circulated between said balloon and a heat exchange source outside the patient's body, and Step G

comprises controlling the amount of heat exchanged with the heat exchange fluid outside the patient's body.

49. The method of Claim 47, further comprising:

H. setting an upper variance set point and a lower variance point;

I. controlling said heat exchanger between an active state when said heat exchanger is active to exchange heat with the body fluid in heat exchange proximity with said heat exchanger and an inactive state so that said heat exchanger is active while said sensed temperature is equal to or greater than said pre-selected temperature;

J. causing said heat exchanger to enter said inactive state when said sensed temperature is equal to or less than said pre-selected temperature;

K. maintaining the heat exchanger in said inactive state until the sensed temperature is equal to or greater than the upper variance set point, or equal to or less than the lower variance set point; and

L. activating the heat exchanger to start cooling said body fluid when said sensed temperature is equal to or greater than said upper variance set point and activating the heat exchanger to start warming said body fluid if said sensed temperature is equal to or less than the lower variance set point.

50. A catheter device for placement in a fluid containing portion of the body of a mammalian patient to effect in situ heat exchange, said catheter device comprising:

an elongate flexible catheter having a proximal end and a distal end, the entire length of said flexible catheter being defined as the distance from its proximal end to its distal end;

said flexible catheter having a distal insertion portion, which is insertable into the patient;

a heat exchanger located at a first location on the catheter, said heat exchanger having heat exchange fins extending from the surface of said heat exchanger, said heat exchange fins comprising increased surface area for enhanced heat exchange, said heat exchanger being operative to exchange heat between body fluid in heat exchange proximity to said heat exchanger and heat exchange fluid circulating through said heat exchanger, said first location extending less than the entire length of the catheter;

at least one fluid lumen in through which said thermal exchange fluid may be circulated;

a working lumen, said working lumen extending through said at least part of said insertion portion.

51. The catheter device of Claim 50 wherein the heat exchanger comprises:

at least one balloon through which said thermal exchange fluid is circulated, and said heat exchange fins comprise a plurality of lobes.

52. The catheter device of Claim 50 wherein said at least one heat exchange fin comprises at least one outwardly extending longitudinal fin.

53. The catheter device of Claim 50 wherein said at least one heat exchange fin comprises at least one outwardly extending annular fin.

54. The catheter device of Claim 50 wherein said at least one heat exchange fin comprises at least one outwardly extending helical fin.

55. The catheter device of Claim 50 wherein said at least one heat exchange fin comprises a plurality of outwardly extending individual protuberances.

56. A system comprising the catheter device of Claim 50 further in combination with:

a guide wire sized to be passable through said working lumen.

57. A system comprising the catheter device of Claim 50 further in combination with:

an apparatus for infusion of a medicament through said working lumen.

58. The system of Claim 57 wherein said apparatus for infusion contains a medicament selected from the group of medicaments consisting of:

a thrombolytic agent;

an anticoagulant;

a neuro-protectant;

a barbiturate;

a anti-seizure agent;

an oxygenated perfusate;

a vaso-dilator;

an agent which prevents vaso-spasm;

an agent to prevent platelet activation; and,

an agent to deter the adhesion of platelets.

59. A system comprising the catheter device of Claim 57 further in combination with:

an apparatus for infusion of a radiographic contrast agent through said working lumen; and,

an imaging apparatus for imaging the radiographic contrast agent which has been infused through said working lumen.

60. A system comprising the catheter device of Claim 57 further in combination with a therapeutic apparatus which is passable through said working lumen.

61. The system of Claim 60 wherein said therapeutic apparatus is selected from the group of therapeutic apparatus consisting of:

an angioplasty catheter;

an embolectomy catheter;

an occlusion member delivering catheter;

an embolization member delivering catheter;

an electro-cautery device; and,

a microcatheter.

62. A system comprising the catheter device of Claim 57 further in combination with a diagnostic device which is passable through said working lumen.

63. The system of Claim 62 wherein said diagnostic device is selected from the group consisting of:

an angiographic catheter;

a sensor.

64. A catheter device which is insertable into an anatomical structure of a mammalian patient through which body fluid may flow to a target region of the patient, said catheter device being operative to effect in situ heat exchange with the body fluid to effect temperature alteration of the target region, said catheter device comprising:

an elongate flexible catheter having a proximal end and a distal end, the entire length of said flexible catheter being defined as the distance from its proximal end to its distal end;

at least one fluid lumen in through which said thermal exchange fluid may be circulated;

a heat exchanger located at a first location on the catheter, said heat exchanger being operative to exchange heat between body fluid in heat exchange proximity to said heat exchanger and heat exchange fluid circulating

through said heat exchanger, said first location extending less than the entire length of the catheter;

a body-fluid channeling sleeve formed about a segment of said catheter including the first location at which at least a portion of said heat exchanger is located, said body fluid channeling sleeve defining a body fluid flow space between said body fluid channeling sleeve and said catheter, said body fluid channeling sleeve having a body fluid inlet located proximal to the heat exchanger and a body fluid outlet located distal to at least a portion of said heat exchanger, such that body fluid will enter the flow space through said body fluid inlet, will then flow through said flow space in heat exchange proximity to at least a portion of said heat exchanger, and then out of said body fluid outlet and to a conduit in fluid communication with said target region of the patient's body.

65. The catheter device of Claim 64 for controlling the temperature of a target region of the patient's body to which a body fluid is flowing through a first anatomical conduit of a first diameter, and wherein said first anatomical conduit is connected to and in fluid communication with a second anatomical conduit of a second diameter larger than said first diameter, wherein said body-fluid channeling sleeve has a distal portion and a proximal portion, said body fluid outlet located on said distal portion and said body fluid inlet located on said proximal portion, said distal. portion is sized to be advanced into said first anatomical conduit while said proximal portion remains positioned within the second anatomical conduit, such that body fluid from said second anatomical

conduit will enter the flow space through said body fluid inlet, will then flow through said flow space in heat exchange proximity to said heat exchanger, and then out of said body fluid outlet into said first conduit and thus to said target region of the patient's body.

66. A catheter device as in Claim 65 wherein the cross-sectional diameter of said distal portion of the blood channeling sleeve is smaller than the cross-sectional diameter of said proximal portion of the blood channeling sleeve.

67. A catheter device as in Claim 65 wherein said distal portion has a shoulder formed thereon, said shoulder sized and configured to fit snugly within said anatomical conduit such that substantially all flow of said body fluid from said second anatomical conduit to said first anatomical conduit flows through said body fluid channeling sleeve.

68. The catheter device of Claim 64 wherein the heat exchanger comprises:

at least one balloon through which said thermal exchange fluid is circulated, and said heat exchange fins comprise a plurality of lobes.

69. The catheter device of Claim 64 wherein said at least one heat exchange fin comprises at least one outwardly extending longitudinal fin.

70. The catheter device of Claim 64 wherein said at least one heat exchange fin comprises at least one outwardly extending annular fin.

71. The catheter device of Claim 64 wherein said at least one heat exchange fin comprises at least one outwardly extending helical fin.

72. The catheter device of Claim 64 wherein said at least one heat exchange fin comprises a plurality of outwardly extending protuberances.

73. The catheter device of Claim 64, said catheter further comprising an insertion portion, said insertion portion for insertion into the patient, said insertion portion extending from the distal end to a point short of the proximal end; and a working lumen, said working lumen extending through at least part of said insertion portion

74. A system comprising the catheter device of Claim 73 further in combination with:

a guide wire sized to be passable through said working lumen.

75. A system comprising the catheter device of Claim 73 further in combination with:

an apparatus for infusion of a medicament through said working lumen.

76. The system of Claim 75 wherein said apparatus for infusion contains a medicament selected from the group of medicaments consisting of:

a thrombolytic agent;

an anticoagulant;

a neuro-protectant;

a barbiturate;

an anti-seizure agent;

an oxygenated perfusate;

a vaso-dilator;

an agent which prevents vaso-spasm;

an agent to prevent platelet activation; and,

an agent to deter the adhesion of platelets.

77. A system comprising the catheter device of Claim 73 further in combination with:

a diagnostic probe which is passable through said working lumen.

78. A system as in Claim 77 wherein said diagnostic probe is selected from the group consisting of:

an angiographic catheter;

a temperature sensor;

a pressure sensor;

a blood gas sensor; and

an enzyme sensor.

79. A system comprising the catheter device of Claim 73 further in combination with:

an apparatus for infusion of a radiographic contrast agent through said working lumen; and,

an imaging apparatus for imaging the radiographic contrast agent which has been infused through said working lumen.

80. A system comprising the catheter device of claim 73 further in combination with a therapeutic apparatus which is passable through said working lumen.

81. The system of Claim 80 wherein said therapeutic apparatus is selected from the group of therapeutic apparatus consisting of:

an angioplasty catheter;

an embolectomy catheter;

an occlusion member delivering catheter;

an embolization member delivering catheter;

an electro-cautery device; and,

a microcatheter

82. A catheter device as in Claim 64 wherein said body fluid inlet is provided with valves, said valves operable between an open condition and a closed condition, said open condition permitting flow of body fluid into said blood channeling sleeve through said body fluid inlet, said closed condition preventing the flow of body fluid out of said blood channeling sleeve through said body fluid inlet.

83. A catheter device as in Claim 64 wherein said catheter has a distal shaft portion, said distal shaft portion extending from within said blood channeling sleeve distal of said blood channeling sleeve, said distal shaft portion having a central lumen there through, said central lumen in fluid communication with said flow space at a first location and in fluid communication with said conduit in communication with said target region at a second location.

84. A catheter device as in Claim 83 wherein said blood channeling sleeve is sealed around said distal shaft distal of said first location.

85. A catheter device for placement in a fluid containing portion of the body of a mammalian patient to effect in situ heat exchange, said catheter device comprising:

an elongate flexible catheter having a proximal end and a distal. end, the entire length of said flexible catheter being defined as the distance from its proximal end to its distal end;

said flexible catheter having an insertion portion, said insertion portion for insertion into the patient, said insertion portion extending from the distal end to a point short of the proximal end;

a heat exchanger located at a first location on the catheter, said heat exchanger being operative to exchange heat between body fluid in heat exchange proximity to said heat exchanger and heat exchange fluid circulating through said heat exchanger, said first location extending less than the entire length of the catheter, said heat exchanger being curved and having an outer

surface along its outer radius of curvature, and having an inner surface along its inner radius of curvature, said outer surface and said inner surface having substantially different thermal transmissivity.

86. A catheter device as in Claim 85 wherein the upper surface is substantially more thermally transmissive than said lower surface.

87. A catheter device as in Claim 86 sized and configured for placement along the curve of the aortic arch of a human patient such that blood flowing to the head region will pass in heat transfer proximity to the upper surface.

88. A system for controllably affecting the temperature of a patient, said system comprising:

a catheter device comprising an elongate flexible catheter having a proximal end and a distal end, the entire length of said flexible catheter being defined as the distance from its proximal end to its distal end, said flexible catheter having an insertion portion, said insertion portion for insertion into the patient, said insertion portion extending from the distal end to a point short of the proximal end, a heat exchanger located at a first location on the catheter, said heat exchanger having heat exchange fins extending from the surface of said heat exchanger, said heat exchange fins comprising increased surface area for enhanced heat exchange, said heat exchanger being operative to exchange heat between body fluid in heat exchange proximity to said heat exchanger and

heat exchange fluid circulating through said heat exchanger, said first location extending less than the entire length of the catheter;

a sensor that senses data from the patient, generates a signal in response thereto;

a manual input whereby an operator may specify a target parameter;

a controller unit for receiving said signal and said target parameter, and controlling the operation of said catheter device in response to said sensed data and in relation to said target parameter.

89. A system as in Claim 88, further comprising a heating unit, said heating unit operative to exchange heat with said heat exchange fluid.

90. A system as in Claim 89 wherein said heating unit is a solid-state thermoelectric cooler.

91. A system as in Claim 89 wherein said target parameter is a temperature, and said sensor is a temperature sensor, said controller operable to activate said heating unit.

92. A system as in Claim 88 further comprising a plurality of sensors each generating a separate signal, said controller operable to control said catheter in response to a plurality of signals.

93. A System as in Claim 92, further comprising a plurality of catheter devices, said controller operable to control each of said catheter devices.

94. A system as in Claim 93 wherein at least one catheter device imparts heat to said body fluid at a first location, and at least one catheter device removes heat from said body fluid at a second location.